RUSSIA

Environment Protection Bodies Hold Conference in Moscow

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[Vlad Ignatov report under the "Ecology" rubric: "Russia Produces 10 Percent of World Pollutants"]

[Text] The work of an All-Russia Conference of the Russian Federation Ministry of Environmental Protection and Natural Resources with the participation of deputy heads of administrations of federation components and heads of territorial nature protection bodies is winding up today at Parliament Center. For two days, some 400 participants have been taking stock of the work done in 1993 and discussing their goals for the current year.

The Ministry of Environmental Protection and Natural Resources faces a great deal of work. According to its head, Viktor Danilov-Danilyan, in many respects—the discharge into the atmosphere of ozone-destroying substances and sulfur dioxide, the generation of radioactive waste—Russia, on whose territory live only 2.5 percent of the earth's population, accounts today for a tenth of the world's amount of pollutants.

It was pointed out at the conference that the uncertainty of the nature watchdogs' status sometimes led to confrontations with representatives of the other agencies in resolving ecological issues. This problem has been partially eliminated by the Russian Federation Government decree "On Specially Authorized State Organs in the Area of Environmental Protection." Currently a new decree is in the works whose draft gives Ministry of Environmental Protection and Natural Resources staffers broader rights, up to the use of punitive sanctions. There is still no unanimity, however, on the role of territorial nature protection structures. According to a departmental poll conducted by the Ministry of Environmental Protection and Natural Resources, nearly 30 percent of territorial nature protection bodies see their functions in being only coordinators, 24 percent see themselves as coordinators and inspectors, while the majority—47 percent—are prepared to become the only special nature-protection management bodies.

Yablokov on Status of Legislation on Environmental Health Damage

94WN0187A Moscow ROSSIYSKIYE VESTI in Russian 11 Feb 94 p 3

[Article by Aleksey Yablokov, chairman of the Russian Federation Security Council's Interdepartmental Commission on Ecological Safety: "Aleksey Yablokov: 'Each Person Must Decide How To Save Himself and His Children'"]

[Text] According to the findings of the World Health Organization (WHO), the state of the environment accounts for an average of 30 percent of the health of each human being. Obviously, the percentage should be lower in ecologically sound regions and much higher in zones of ecological problems and crises (and at least 15 percent of Russia's territory falls into these categories). It is also obvious that someone must take responsibility for health impairments beyond the citizen's control.

Finally, it is also obvious that the protracted absence of state concern for this connection between the state of public health and the state of the environment has led to one of the most substantial threats to national security because the average lifespan—one of the general statistical indicators of national health—has been plunging disastrously since 1986.

When we say that the state must defend the rights and freedoms of the individual and that individual rights are above all other rights and freedoms, we are also referring to the now constitutionally secured right to compensation for health impairments resulting from the deterioration of environmental quality.

At the beginning of 1992, just after the Russian Federation laws "On Sanitary-Epidemiological Welfare" and "On Environmental Protection" were passed, it became obvious that the exercise of the right of citizens, declared in these laws, to compensation for health impairments caused by environmental factors would require additional legal and analytical work. We need standards and rules stipulating the actions that victims can take to protect themselves from the unfair judicial actions of polluting enterprises. What these victims need even more, however, is reliable proof that a specific impairment is caused directly by the pollution of the environment from a specific source. Without this information, they cannot expect a court to hear the case and rule in favor of the injured party. As a result of the intense work of a team of specialists, mainly connected with Gossanepidnadzor [State Committee for Sanitary-Epidemiological Oversight] and begun in spring 1992 under the auspices of the Russian Presidential Council on Ecological Policy, a set of standards and rules was drafted. The draft has already been "under discussion" in the Ministry of Justice and Ministry of Economics for more than a year, and the end of this process is not in sight. I can appreciate the difficulties this kind of deliberation entails: This document would grant citizens rights comparable to the right to protect personal inviolability and the right to own property.

In view of these difficulties, a decision was made to enlist the aid of epidemiologists in the codification of the effects of specific environmental pollutants on various health indicators—in a format suitable for a judicial hearing.

It was not possible to achieve all of these goals: The information that is being published today sometimes sounds more like a scientific treatise than the anticipated

set of guidelines, but even the results to date are important enough to publish. The effects of other ecological factors of human origin on human health—chemicals, as well as noise, radiation, and others—will also be analyzed in the future. We hope that this research will eventually be recognized as the official set of standards and guidelines.

Armed with an awareness of the general state of affairs and the effects of pollution on his own health and the health of his children and grandchildren, each individual will choose his own method of avoiding this potential danger—by leaving the zone affected by the pollutant or be uniting with other affected citizens and forcing the polluter (through various channels, including judicial proceedings) to stop the pollution.

Therefore, the report that is being published today was written, on the one hand, for the public—to inform each citizen and offer more effective protection of the right of each citizen to a healthy environment—and, on the other, for the administrators and owners of sources (irrespective of forms of ownership) of dangerous chemical pollution, so that they will stop the hazardous emissions and dumping without waiting for legal judgments against them.

We wish to thank the newspaper and its special "Prescription" supplement for this publication—it is addressed to literally each person in Russia.

An applied science conference will be held soon on "Problems of Public Rehabilitation in Zones of Ecological Damage." The conference will be held by an association of trade unions in regions with unhealthy ecological conditions and by the International Fund for Socioecological Aid. Through the efforts of these organizations, the participants in the conference should receive our report in the form of a brochure to be used as a guide for action. These may just be the first tentative steps, but they are signs of progress....

Draft Document on Effects of Pollution on Health of Russian Population

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[Abridged report of Interdepartmental Commission of RF Security Council on Ecological Safety: "Each Person Must Decide How To Save Himself and His Children"]

[Text] Around 28.2 million tonnes of pollutants from 18,000 stationary sources and another 22 million tonnes from mobile sources were discharged into the air of Russian cities and smaller communities in 1992. This is equivalent to 300 kilograms of pollutants for each inhabitant of Russia during the year. The leaders in industrial discharges of solid substances are Magnitogorsk, Nizhniy Tagil, and Chelyabinsk, as well as the cities of Asbest, Troitsk, and Suvorov; the highest levels of sulfur dioxide emissions have been recorded in Norilsk, Monchegorsk, Nikel, Orsk, and Omsk; the highest levels of nitrogen dioxide emissions are in Moscow, St. Petersburg, Surgut, Asbest, and Omsk; the highest levels of carbon monoxide emissions are in Novokuznetsk, Magnitogorsk, Lipetsk, Cherepovets, and Nizhniy Tagil. Vehicle emissions are at the highest levels in Moscow, St. Petersburg, Krasnodar, Omsk, Ufa, Volgograd, Nizhniy Novgorod, Samara, and Voronezh. Calculation methods based on the relationship between the total amount of substance discharged and its allowable concentration are used in the hygienic assessment of discharges of toxic substances into the air. This coefficient, which is known as the "relative risk coefficient," served as the basis for the categorization of substances in order of risk and the cities where these substances are present in the atmosphere.

The main substances recorded were benzpyrene, sulfur dioxide, and nitrogen oxides, which are connected with the substantial emissions of power engineering facilities, and lead.

It must be borne in mind that official emission statistics do not reflect the whole spectrum of pollutants because some enterprises do not submit this information in the necessary detail. Furthermore, many enterprises discharging substances containing toxic metals that are dangerous to human health are not included in these indicators.

Official air pollution statistics also do not include emissions of toxic metals resulting from the consumption of solid and liquid fuel (coal and fuel oil). Calculations based on information about the elements of fuel indicate that the volatile microelements contained in coal—arsenic, mercury, bromine, and antimony—enter the atmosphere along with thousands of tonnes of vanadium, manganese, fluorine, and zinc compounds. The estimated 80 million tonnes of fuel oil used each year in power engineering pollute the air with thousands of tonnes of vanadium, nickel, boron, and bromine and dozens of tonnes of many other elements. Motor transport is a major source of lead particles in the air of virtually all Russian cities (except Moscow). These emissions can amount to 2,000 tonnes a year. An assessment of the relative danger of discharged metals indicates that lead is the main hazard—furthermore, it is the most pervasive element—followed by compounds of vanadium, nickel, manganese, and fluorine.

The relative danger of pollutants in the air of different cities was judged by six types of substances (solids, sulfur dioxide, nitrogen dioxide, carbon monoxide, hydrocarbons, and volatile organic compounds) listed in official reports.

The leaders in terms of the relative danger of emissions per unit of municipal area are Norilsk, Nikel, Novotroitsk, Angarsk, Monchegorsk, Novokuybyshevsk, Magnitogorsk, Cherepovets, Orsk, Yuzhno-Sakhalinsk, Novokuznetsk, Nizhniy Tagil, Zima, Zapolyarnyy, Sterlitamak, Lipetsk, and Salavat (Table 1).

Relative Risk Coefficient of Pollution in Some Cities

City	Coefficient
Moscow	0.70
Yekaterinburg	0.74
Kaliningrad	1.21
Berezniki	1.59
Prokopyevsk	1.64
Samara	1.70
Ufa	1.78
Arkhangelsk	1.98
Komsomolsk-on-Amur	2.21
Volzhskiy	2.27
Perm	2.90
Krasnoyarsk	3.18
Khabarovsk	3.18
Chelyabinsk	3.45
Volgograd	3.51
Dzerzhinsk	3.65
Kemerovo	3.95
Tolyatti	3.99
Kamensk-Uralskiy	4.04
Shelekhov	4.19
Groznyy	4.26
Barnaul	4.36
Omsk	4.49
Salavat	5.67
Lipetsk	5.99
Sterlitamak	6.19
Zima	7.23
Zapolyarnyy	8.55
Nizhniy Tagil	8.98
Novokuznetsk	9.57
Yuzhno-Sakhalinsk	10.14
Orsk	10.52
Cherepovets	12.28
Magnitogorsk	12.30
Novokuybyshevsk	13.88
Monchegorsk	14.17
Angarsk	14.44
Novotroitsk	15.35
Nikel	22.83
Norilsk	85.85

Many cities where the air is polluted by substantial quantities of organic and inorganic substances—small and medium-sized metallurgical cities in the Urals and the chemical production areas in Stavropol Kray and in Kirov and other oblasts—are not on the list.

A detailed description of the composition of emissions, with a view to the makeup of organic substances and the presence of metals, could change the ranking of cities considerably. The problem of dioxins entering the air and the environment also requires immediate action. Existing estimates and evaluations of technological processes suggest that the existence of dioxin could present problems in around 20 cities in Russia.

The large quantities of substances entering the air of cities are resulting in higher concentrations of pollutants in the air. According to the 1992 state report on the environment of the Russian Federation, levels of air pollution exceeding 10 times the maximum allowable concentration (MAC) were recorded in many of Russia's cities and industrial centers. The most highly polluted cities with metallurgical industry include Lipetsk, Magnitogorsk, Kamensk-Uralskiy, Krasnoyarsk, Nizhniy Tagil, Novokuznetsk, Cherepovets, and Bratsk; the most highly polluted cities with chemical industry include Berezniki, Omsk, Perm, Tolyatti, Usolye-Sibirskoye, and many others. The combined findings of air pollution studies by Roskomgidromet [Russian Hydrometeorology Committee] indicate the presence of a variety of pollutants in the air of many cities (Table 2).

Cities with the Highest Concentrations of a Group of Specific Pollutants

City	Substances and maximum concentrations
Perm	ammonia (74), hydrogen chloride (12), ethylbenzene (59), toluene (64), benzene (13), xylene (26), styrene (58), sulfuric acid (22)
Omsk	ammonia (30), xylene (4-6), ammonia (24)
Berezniki	hydrogen chloride (15), sulfuric acid (17), xylene (3)
Dzerzhinsk	hydrogen chloride (20), ethylbenzene (30)
Tolyatti	ammonia (30), toluene (14), benzene (9), styrene (20), xylene (3)
Kemerovo	ammonia (27), formaldehyde (11)
Nizhniy Tagil	phenol (5)
Lipetsk	formaldehyde (10), ammonia (10)
Volzhskiy	hydrogen sulfide (47), formaldehyde (2)

The group of identified substances in the air depends largely on the analytical capabilities of local laboratories, and this is the reason for the high number of identified ingredients in Perm, for example, with its well-equipped laboratory. The results of air quality surveys at Roskomgidromet stations that are published in almanacs provide no opportunities for assessing the spatial features of pollutant distribution. Air pollution levels near enterprises are much higher, however, than the city averages. In the air near the Permneftorgsintez enterprise in Perm, for example, the concentration of phenol can be as high as 22 times the MAC, the concentration of sulfur dioxide is 3.8 times the MAC, and the concentration of nitrogen dioxide is 6.6 times the MAC. The concentrations of formaldehyde, acetaldehyde, acrylaldehyde, acetone, ethanol, and butanol in the air of residential neighborhoods near the Khimvolokno and Azot enterprises in Kemerovo are 250 times the MAC.

Higher concentrations of pollutants in the air are carried for long distances encompassing sizable developed territories. In Berezniki, for example, a city surrounded by potassium production units, the concentration of many pollutants exceeds the maximum allowable concentration even at a distance of 5 kilometers from the plant.

An analysis of some of the results of air pollution surveys conducted by the public health service, scientific research institutes, and departmental laboratories revealed even more problems with air quality than those listed in the reports of Roskomgidromet.

Pediatrics and Air Pollution

The level (or quality) of public health depends on many biological, socioeconomic, medical-organizational, and ecological factors. An analysis of just one health indicator—the number of children with chronic illnesses in clinic records—throughout the Russian Federation reveals that the number doubled between 1980 and 1990 and reached around 6.5 million in 1990. Therefore, one out of every five children had one chronic illness. Of the 16 recorded types of illnesses, there was a higher rate of chronic pharyngitis, nasopharyngitis, and sinusitis (2.3 times the earlier figure), iron deficiency anemia (1.5 times), and bronchial asthma (1.3 times). The ecological component plays a significant role in the etiology of all of these illnesses. It is possible that if there were separate medical statistics for the urban population of large industrial cities, the rise in the rate of illness would be even more perceptible there.

Studies of the health of schoolchildren, conducted according to a single set of methods over many years (1960-1990), indicated that the number of virtually healthy children in the first grade decreased over the 30 years from 60.8 percent to 45.4 percent, and the number in the eighth grade decreased from 59.8 to 47.9 percent. The rate of chronic illness in these age groups rose from 39.2 to 54.6 percent (first grade) and from 40.2 to 52.1 percent for the eighth-graders.

The most severe effects of environmental pollution ta the form of the higher rate of infant mortality and the increased frequency of birth defects.

Many studies of the effects of environmental pollution on the state of public health record a significant rise in various indicators of illness among children, primarily respiratory disorders.

Half of the adult patients have suffered from bronchial asthma since childhood. In recent years this disease has grown indisputably "younger." Cases of bronchial asthma in children in the first months of life are no longer extremely rare. In some cities the number of people with bronchial asthma is five or six times as high as it was. In Moscow, for example, the rate of bronchial asthma among children was seven times higher in 1981 than in 1949 (6.9 cases for each 1,000 children). In St. Petersburg the number of children suffering from bronchial asthma increased from 2.9 per 1,000 in 1982 to 3.7 per 1,000 in 1987. The number suffering from asthmatic bronchitis also rose: from 6 to 7.7 per 1,000 (T. Pogorelova and I. Malysheva, 1986). The rising rate of bronchopulmonary disorders is connected largely with air pollution in the cities. The rate of upper respiratory disease in children in the zone affected by chemical production units in Samara is twice as high as the average. The rate in neighborhoods near petrochemical production units and petroleum refineries is 2.5 times as high; the rate near the metallurgical combine is 4 or 5 times as high, and so forth. In a city with metallurg industry the rate of otorhinological disease is 3-5 ti the average near the combine, 2-3 times the average at a distance of 1.5 kilometers from the combine, and 1.5 times the average at a distance of 6 kilometers.

Moscow Statistics Illustrating Spatial Features of Distribution of Bronchial Asthma Among Children

The highest levels of air pollution are in the center, northwest, and northeast of the city. The rate of bronchial asthma in children within the territory of 110 pediatric clinics here is three or more times as high as indicators in "clean" districts of the city. All exceptions were closely correlated with the spatial locations of major highways and industrial enterprises. The loci of this illness are concentrated in homes situated near the zoo, the race track, the perfume factory, and other plants and major highways.

...A direct relationship between bronchopulmonary disease in children and the level of air pollution has also been discovered in several other parts of the country. The very fact that twice as many children in the Russian Federation died of bronchial asthma in 1990 as in 1980 is indicative.

The results of clinical epidemiological studies of the role of air pollution in the onset of pulmonary disease in children in one of the most highly polluted Russian cities—Nizhniy Tagil—are indicative.

Starting in the 1970s, more and more children in Nizhniy Tagil began complaining of hoarseness and breathing difficulties that did not fit the usual clinical definition of pneumonia or typical bronchial asthma. The same child could suffer from bronchial obstructions several times a year. This coincided with the start-up of the bank of coke ovens in December 1986 without the necessary dust and air filters. It was then that the rate of tracheobronchitis rose and asthmatic attacks in children became more common. The number of children hospitalized with bronchial asthma in the city also rose.

The effects of air pollution are experienced by the residents of industrial cities and of small communities located near industrial enterprises, gas and oil fields, and toxic waste disposal sites. There is so little information about the state of public health in these communities, and the findings of existing studies can only be viewed as preliminary results.

The village of Cherkasskiy near Ufa has a population of 2,300. The village is surrounded on three sides by oil refineries, a synthetic alcohol plant, and the "Khimprom" enterprise. Concentrations of phenol in the air are 1.9-4.2 times the MAC, the level of hydrocarbons is 2.7 times the MAC, and the hydrogen sulfide level is 1.5 times the MAC. Drinking water does not meet standard requirements in terms of organoleptic or chemical indicators. The children there are more likely than those in the control group to suffer from disorders of the respiratory organs, the central nervous system, the skin, and the urinary organs. The rate of these illnesses is also higher among adults, as well as the rate of cardiovascular and otorhinolaryngological disease (materials of the Ufa Scientific Research Institute of Human Ecology and Occupational Medicine).

The pollution of the air with emissions of specific pollutants has had severe effects in several cases: Specific symptoms and complex syndromes. The most disturbing and most vivid examples are the effects of the operations of plants producing protein-vitamin concentrates and other enterprises of the microbiological industry....

The rate of bronchial asthma rose dramatically in Angarsk after the start of operations at the protein-vitamin concentrate plant in 1979. The number of cases of chronic upper respiratory disease in children increased 7.3-fold and there was an eightfold increase in the number of cases of chronic bronchitis. The mass poisoning of the population occurred in 1988.

People living near plants producing antibiotics in Saransk have complained of frequent pains in their joints and skin rashes. The growth of antibiotic production has been accompanied by coughing, sneezing, and allergic rhinitis. Special studies attest to the specific allergization of the organism to penicillin (52 percent of the respondents), the candida antigen (54.5 percent), or both antigens (29 percent).

...In the "aluminum" cities, just as in some other large industrial centers, dental pathology is accompanied by changes in the whole motor-reflex apparatus in children.

A special in-depth study of the children in Shelekhov, which is the site of an aluminum plant, revealed that the frequency of skeletal dysplasia was three times the average, corroborating the data on the osteotropic properties of fluoric compounds.

Physical Development of Children

A variety of functional and morphological defects in children exposed to the effects of air pollution arises virtually at the time of birth. This is connected with the effects of air pollution on the mother during pregnancy and prior to conception.

In Moscow the average weight of the newborns of mothers living in the zone affected by emissions from the Motor Vehicle Plant imeni Likhachev is 400 grams (or 10 percent) below the average weight in the southwestern subway region.

Cities and villages of the copper ore mining and enriching combines in the Urals have a higher number of children with extreme anthropometric characteristics. These cities are marked by lower indicators of body length at birth and less balanced anthropometric indicators.

Children weigh less on the average in Novotroitsk near the Orsk-Khalilov metallurgical combine and in Orenburg (materials of the School of Hygiene of the Orenburg Medical Institute).

A comparative analysis of the growth standards of physical development in infants and toddlers (the first three years of life) for oblast centers—Ufa, Yekaterinburg, Nizhniy Novgorod, and Samara—revealed that the worst indicators were in Ufa: clear signs of increasing asthenia (narrow chest and minimal weight combined with minimal growth). The physical development of children in different regions of Ufa revealed verifiable disparities depending on the intensity of the influence of anthropogenic factors (materials of the Bashkir Medical Institute).

Lower anthropometric indicators were also found in children of pre-school age in the zone affected by emissions of boron production units in Dalnegorsk, ferroalloy production units and enterprises producing building materials (keramzit gravel and asphalt) in Moscow, copper smelting and aluminum plants, and many other production units.

In one of the most highly polluted neighborhoods in Moscow (Kalininskiy Rayon), there were 5 percent fewer children between the ages of 3 and 7 with balanced (or proportional) physical development and almost twice as many children who were underweight or overweight.

These deviations from anthropometric standards are indicators of the state of pediatric health at the time of

the study and indicators of possible subsequent changes. Children with maximum deviations from average anthropometric characteristics are known to suffer more frequently from pathological changes than children who deviate little from the norm. An analysis of the development of children in the "copper" cities of the Urals indicates retarded physical and neuropsychological development (these children are older when they take their first steps) and delays in primary dentition. These children are also older than the average when they begin speaking. Therefore, changes in the normal physical development of children, particularly in combination with an unhealthy lifestyle (hypodynamia, inadequate physical training, and so forth), can lead to deviations in the state of their health later as well. As a rule, however, it is rarely possible to define the main external factor or only external factor destroying the nervous system in children. Special studies have established the influence of small doses of lead, mercury, and organic phosphates (pesticides), a shortage of iodine, and possibly of goitrogenic substances affecting the neuropsychological development of children.

Paradoxically, the development of the system most vulnerable to ecopathogenic influences in children, namely the brain, and deviations in the neuropsychological development of children in the zones of ecological stress have not attracted enough attention from pediatricians, psychoneurologists, hygienists, and ecologists.

Health of the Adult Population and Air Pollution

It is difficult to assess the state of health of the adult population in cities with higher levels of environmental pollution. This is due to the lack of official statistical reports and to the procedural difficulties of keeping records of this kind, which require consideration for the role of occupational factors, bad habits, and the lifestyle in general. There are some studies that offer convincing evidence of the negative role of air pollution.

The rate of chronic respiratory and pulmonary disease (pneumonia, bronchitis, laryngitis, and pharyngitis) and otitis in adults between the ages of 15 and 60 in Vladimir was 2.8 times as high in the zone affected by emissions from the chemical plant as in the control group.

A detailed study of the effects of air pollution on public health was conducted in Novokuznetsk.

The non-specific pulmonary disorders of workers of the metallurgical combine were studied to assess the effects of air pollution on the health of the adult population. In accordance with hygienic air quality surveys in the developed part of the city, workers were divided into one group living in the zone of maximum air pollution, a second group living in regions with average pollution, and a third in the zone of minimal pollution.

The engineering and technical personnel and employees of the combine with no contact with occupational hazards of a chemical nature were used as the control group. This method revealed some tendencies in the combined effects of chemical pollutants on the health of workers in production and non-production areas.

Perceptible differences were discovered in an analysis of the general rate of illness among workers living in the zone of maximum air pollution and workers in the zone of minimal pollution.

Unfavorable ecological conditions lead to the development of occupational pathology. The Novokuznetsk aluminum plant workers living near the plant, for example, were twice as likely to suffer from occupational fluorosis. It developed much more quickly in this group, and cases of toxic hepatosis and specific changes in dental enamel were more common, reflecting the influence of fluorides at work and at home.

A study of the effects of air pollution on the frequency of requests for emergency medical treatment for cardiovascular and pulmonary disease revealed a direct connection. The number of requests for emergency treatment for cardiovascular disorders was 2.4 times as high as in the zone with a relatively low level of air pollution (materials of the Comprehensive Hygiene and Occupational Disease Institute of the Siberian Department of the Russian Academy of Medical Sciences in Novokuznetsk).

Similar patterns were observed in other large industrial centers in East Siberia—Bratsk and Angarsk.

Indicators of requests for medical assistance by adults with no relationship to occupational hazards were much more numerous in Bratsk than in other cities in Irkutsk Oblast—Selenginsk and Baykalsk. The population of Bratsk is more likely to suffer from disorders of the nervous system, sensory organs, and cardiovascular system (1.2-1.9 times as likely). Besides this, the inhabitants of Bratsk are more likely to seek treatment for immunologic disorders and diseases (N. Matorova et al, 1990).

A verifiable connection was established in Angarsk between the levels of short-term air pollution in the city and the daily patient rate—and in some years, the daily death rate. Chemical air pollution was responsible for 6-21 percent of the fluctuations in the daily patient rate (for different categories of illnesses) and 2.7-19.4 percent of fluctuations in the daily death rate (Ya. Leshchenko et al, 1993).

Public Health and Food Pollution

Food can be the source and agent of many chemicals posing a potential threat to human health.

The results of surveys conducted from 1988 to 1991/92 indicate that from 0.8 to 3.8 percent of the analyzed samples of food products exceeded public health limits for lead, from 1.1 to 1.7 samples exceeded the cadmium limits, and from 0.4 to 4.7 percent exceeded mercury limits (V. Tutelyan et al, 1993).

High levels of environmental pollution by metals in the environs of metallurgical production units can cause the considerable accumulation of toxic metals in vegetables, fruit, and berries. The content of heavy metals—lead, cadmium, chromium, and nickel—is extremely high in vegetables and berries grown between the cities of Revda and Pervouralsk in direct proximity to [passage omitted in source]

In Russia as a whole, there were signs of nitrate pollution in from 9.8 to 7.7 percent of all analyzed samples of food products.

Levels of food pollution began to decline in 1990. The degree of produce pollution by pesticides also decreased (from 3.2-3.5 percent in 1988/89 to 1.7-2 percent in 1991/92), but pesticide levels are still quite high in some parts of Russia. In Krasnodar Kray, for example, pesticide use is two or three times the national average.

Studies of the state of public health in different parts of Krasnodar Kray indicate that high pesticide levels in communities in grain and rice farming regions are accompanied by higher rates of otorhinolaryngological disease, bronchial asthma, tuberculosis of the respiratory system, severe respiratory infections, and retarded physical development in children. Changes in the state of health are less pronounced in the adult population, but the rate of treatment for arterial hypertension and disorders of the digestive organs is three times as high.

The health of children is much worse in regions with high pesticide levels in Rostov Oblast.

Reproductive Health

The reproductive health of the population is one of the most accurate indicators of public health and an indicator of local ecological conditions.

Environmental pollution causes disturbances of endocrine functions and the immune, hemopoietic, and other systems in pregnant women and infants.

The rate of severe pregnancy complications is constantly rising in Russia. The rate of pregnancy-related toxemia rose by 41 percent between 1981 and 1989, representing 7.7 cases per 100 births. Furthermore, cases of severe forms of toxemia—eclampsia and preeclampsia—increased 4.8-fold. Pregnant women were 2.6 times as likely to suffer from anemia, twice as likely to suffer from kidney disorders, and 21.9 percent more likely to suffer from cardiovascular disease (N. Vaganov, 1991).

Although the rate of prenatal problems has risen everywhere, the rise is more pronounced in large industrial centers, where many women are employed in jobs with hazardous working conditions.

In Ufa the rate of toxemia in pregnant women rose from 8.9 to 20.1 per 100 births in the last 21 years. This is almost three times as high as the republic average. The reason is the employment of many of the women at enterprises of the petrochemical complex (Bashkir Medical Institute, 1992).

It is extremely difficult to gage the effects of environmental pollution in these cities on the state of reproductive functions. An analysis of the health indicators of pregnant women not employed in hazardous jobs but living in highly unsatisfactory ecological conditions confirms the presence of significant disparities.

Women in the metallurgical cities of the Urals—Kamensk-Uralsk, Kirovograd, and the Novokuznetsk neighborhoods near the aluminum plant—were more likely than the women in the control group to suffer miscarriages, spontaneous abortions, premature births, and other pathological disorders.

A similar situation was recorded in Krasnokamsk in Perm Oblast, the site of a pulp combine.

In Baykalsk and Bratsk, other cities with pulp and paper industry, and in Shelekhov, a city with aluminum production units, disorders of reproductive functions were much more severe than in a "cleaner" city in East Siberia.

Infant Mortality

The rate of infant mortality is an important indicator of the quality of public health and social welfare.

It is extremely difficult to judge the effects of environmental pollution in cities on the rate of infant mortality. Studies in this field are extremely few in number.

Indicators of the early neonatal death of infants (death in the first week of life) over nine years in seven cities and seven rural rayons inhabited by around 2 million people were studied in Chelyabinsk Oblast (Chelyabinsk-40). The rate of infant mortality turned out to be most closely related to the level of nitrogen dioxide emissions (correlative coefficient of $r=0.76$) and hydrocarbons ($r=0.79$). These factors have an impact of around 60 percent on the rate of infant mortality. The same study, incidentally, did not establish a connection between radiation levels and birth defects and early neonatal mortality.

A comparative analysis of infant mortality rates in the urban and rural populations is of some interest in revealing the role of the ecological factor.

The rate was higher in urban locations in 14 oblasts. They included such industrially developed territories as Moscow, Kursk, Lipetsk, Rostov, Orenburg, and Novosibirsk oblasts and the Republic of Bashkiria.

Effects of Environmental Pollution on Rate of Malignant Tumors in Russia

The rise in the rate of malignant neoplasms in Russia is staying ahead of general population growth and the growth of the population over the age of 60.

The number of new cases of oncological disease among citydwellers increased 1.7-fold in the last 20 years. The number of people first diagnosed with malignant growths in Russia rose by 23 percent between 1980 and 1991 and reached 394,300, corresponding to an average of 1,080 new patients a day. The number of patients who died during this period rose by 30 percent and amounted to 290,500 in 1991 (an average of 796 deaths a day). Death from malignant neoplasms has reduced the average lifespan of the male population of Russia by 2.8 years and the female lifespan by 2.2 years. The amount of hypothetical unproduced national income resulting from this is 4.1 billion rubles (in 1990 prices). The number of new cases of disease is expected to rise to 480,000 by the year 2000, or one new case each 66 seconds, and the number of deaths is expected to rise to 346,000 (or 940 a day). Around 18 of every 100 babies born in Russia in 1991 could suffer from malignant neoplasms, and the average lifespan of patients in some age groups could be as low as one-seventeenth of the general lifespan of these age groups (Ye. Aksel et al, 1993). The number of people categorized as completely disabled by malignant neoplasms exceeded 72,000 in 1990 in Russia, or 20.2 percent of the total number.

Conclusion

The adverse effects of environmental pollution on public health in Russia are a genuine threat to national security and can affect each of us. According to current estimates, around 20 percent of the total rate of illness is connected with the irritating effects of environmental pollution; in some areas the figure can be much higher. Regrettably, conclusive studies providing quantitative assessments of the contribution of environmental pollution to the development of various diseases are extremely few in number. The definite deterioration of public health indicators in recent years has been connected with environmental pollution and with socioeconomic difficulties.

A more complete understanding of the role of environmental pollution in changes in the state of public health could result from the improvement of several types of activity on the federal, regional, and local levels. They include the following:

—more detailed reports of the discharges and emissions of all potential polluters, with lists of the substances entering the atmosphere and surface and ground water, and detailed reports of the substances in solid waste disposal sites;

—improvements in the pollution monitoring system for more complete records of the whole range of pollutants in a specific territory and for information about the spatial distribution of pollutants;

—the widespread use of modern remote methods of emission control—such as the laser and sonar systems—for constant and current data on pollutants;

—a better system of regional and federal public health statistics with more detailed breakdowns (by ages and territories);

—the collection of statistical data for small territories that might be subject to the effects of various types of pollutants;

—analytical epidemiological studies to determine risk and dose indicators for specific pollutants and their combinations;

—the compilation and implementation of national programs to minimize the effects of all substances known to be highly toxic (benzpyrene, PAC's, PCB's, radon, beryllium, cadmium, lead, and other toxic metals).

Vladivostok Orders Halt To Scrapping of Atomic Submarines

LD2303154094 Moscow Mayak Radio Network in Russian 1430 GMT 23 Mar 94

[Text] Today, the administration of Maritime Kray released a statement in which it said that dismantling and scrapping of atomic submarines is to be halted at the Zvezda yard at the settlement of Bolshoy Kamen. Discharge of liquid radioactive waste stored aboard the tanker DMT-5 into the Sea of Japan is also planned. The tanker is now in a dangerous condition. The radioactive waste poses a real threat to Vladivostok and a number of areas of Maritime Kray. That was a report from POST-FACTUM agency.

Norwegian Document on Russian Reactors' Disposal Cited

PM2303111794 Moscow IZVESTIYA in Russian 23 Mar 94 p 3

[Report by Marat Zubko: "Russia Will Sink Reactors in Kara Sea"]

[Text] Helsinki—The Norwegian ecological organization "Bellona" has found out the details of the forthcoming removal from combat service of 150 nuclear submarines in the Northern Fleet.

"Bellona" members Nils Bemer and Tomas Nilsen [both names as transliterated] have gained access to Northern Fleet documents which state that in accordance with the START II treaty within the next few years Russia must destroy 150 nuclear submarines with 278 reactors on board.

The authors of the report assert that so far only two submarines have been dismantled in the Northern Fleet but that nuclear fuel has been removed from the reactors of 34 ships. The main part of the submarines will be dismantled in Severodvinsk: There they will extract 206 reactors and 45,000 used fuel elements from the submarines' bellies.

The Norwegians claim that new dry docks and storage facilities for radioactive waste, and moorings for the submarines which have been written off are to be constructed on the Kola peninsula.

The construction should have begun already but so far the majority of establishments are at the planning stage, the report says.

Of course, some of the fuel elements, the "Bellona" experts estimate, could be sent to the "Mayak" storage facility in Siberia. But what is to be done with the other fuel elements, the reactors themselves, and their reactor rooms? In this connection Bemer and Nilsen have the following to say:

"Of the documents we have read and the talks we have had with knowledgeable people it has become clear to us that the Russian authorities have two possible courses of action. The first is to return to the practice of submerging radioactive waste, including reactors, in the Kara Sea, which Russian renounced a few years ago. The second is to construct a major new storage facility somewhere in the Northwest of Russia."

"However," the report's authors continue, "it is known that the storage facilities existing on the Kola peninsula are already full and there is no money to construct new ones. So we believe that the most feasible option is connected with burying the waste at sea. Perhaps that is why Russia is not signing the London convention which bans the discharge of waste into the seas and oceans...."

Pollution Situation Needs 'Urgent Action'

PM2203140194 Moscow SELSKAYA ZHIZN in Russian 12 Mar 94 p5

[Article by SELSKAYA ZHIZN scientific observer Leonid Kruglov: "Departed From Life; Alarming Ecological Situation in Russia Demands Urgent Action"]

[Excerpt] [Passage omitted] National environmental reports only became public here at the end of the eighties. They contain specific information on the current state of our environment. They cite data on the amount of harmful substances discharged into the atmosphere, the pollution of soil and drinking water sources, and the radiation situation. The compilation of these reports is painstaking work performed every year by environmental experts and specialists.

The Russian Federation Ministry of the Environment and Natural Resources recently published the latest State Report for 1992. In the preface to it, Minister V.I. Danilov-Danilyan acknowledges that the state of the environment in Russia as a whole is unsatisfactory: The atmosphere, water, and soil are still being heavily polluted with gaseous, liquid, and solid waste from industry and consumers alike. Moreover, as one should expect, the general slump in output has not led to a similar reduction in pollution, as enterprises in crisis have begun to cut environmental protection costs. Thus the economic situation in the country is aggravating the environmental situation.

The facts cited in this document are not for those of a nervous disposition. The volume of polluting substances discharged into the atmosphere from stationary sources in Russia alone amounts to 28.2 million tonnes. Highly toxic cyanides, arsenic, fluorides, and heavy metal oxides are spewed from these "volcanoes." Their emissions exceed the maximum permissible concentration in the air basin of 171 cities. In Chita, Taganrog, Lipetsk, Bratsk, and Ulyanovsk—in fact, a total of 44 industrial centers in Russia—the atmospheric pollution index has reached a level dangerous to the health of millions of people.

With one-quarter of the world's fresh water resources concentrated in Lake Baykal, we are contriving to pollute these crystal-clear waters with toxins from outmoded pulp and paper combines. The fabled lake's own mechanism of biological self-purification is on the brink of collapse. What then can one say about ordinary reservoirs? In 1992, 39 percent of all untreated sewage flowing into Russia's rivers was discharged into the Volga basin alone.

Due to economic difficulties, the use of pesticides in agriculture fell from 150,000 tonnes in the eighties to 100,000 tonnes in 1992. But supporters of the green movement have no cause to celebrate. Russia uses tens, if not hundreds of different types of toxic chemicals banned in the countries where they are produced, but with a market here because of their low price. They are extremely toxic. Moreover, these toxins have the ability to accumulate in the soil for long periods of time. Analysis shows that soil in Moscow Oblast and Irkutsk Oblast still contains DDT, banned many years ago.

We will not try to explain what all these "curies" and other units for measuring radiation levels mean. For the majority of people, these scientific terms mean nothing, but their lives are no easier for all that. As of January 1993, the territory polluted with radioactive nuclides from Chernobyl—cesium-137 averaging one to five "curies" per square kilometer—includes 16 oblasts and Mordovia. A total of 21,861,000 people currently live there, mainly villagers. By law, they are all due state benefits and compensation. But who will guarantee that even these few "curies" will not affect the health of future generations? Once again, it seems, we are going to rely on the Russian "maybe." Wait and see. But will we live to see?

Analysis of the information in the State Report allows us to draw the uncomfortable conclusion that all these negative ecological factors put together have led to a serious deterioration in the environment in the main regions where tens of millions of Russians live. Living there is dangerous, and turning a blind eye is criminal.